RE: USA National Phase Filing of PCT/IB00/00267

JC05 Rec'd PCT/PTO 0 2 AUG 2001

24. Attached:

25 Per Item 17.c2, **cancel original** pages # ___, claims #___, Drawing Sheets #___

26. **Calculation of the U.S. National Fee (35 U.S.C. 371 (c)(1)) and other fees is as follows:**
Based on amended claim(s) per above item(s) ☐ 12, ☐ 14, ☐ 17, ☒ 25 (hilite)

Total Effective Claims	minus 20 =	x $18/$9 =	$0	966/967
Independent Claims	minus 3 =	x $80/$40 =	$0	964/965
If any proper (ignore improper) Multiple Dependent claim is present,		add$270/$135	+0	968/969

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4)): →→ **BASIC FEE REQUIRED, NOW** →→→→

A. If country code letters in item 1 are **not** "US","BR","BB","TT","MX","IL" "NZ", "IN" or "ZA"

See item 16 re:

1.	Search Report was not prepared by EPO or JPO	add$1000/$500		960/961
2.	Search Report was prepared by EPO or JPO	add$860/$430	+0	970/971

SKIP B, C, D AND E UNLESS country code letters in item 1 are "US","BR","BB","TT","MX","IL", "NZ", "IN" or "ZA"

☐ → ☒	B. If USPTO did not issue both International Search Report (ISR) and (if box 4(b) above is X'd) the International Examination Report (IPER),	add$1000/$500	+1000	960/961
☐ → ☐	C. If USPTO issued ISR but not IPER (or box 4(a) above is X'd),	add$710/$355	+0	958/959
☐ → ☐	D. If USPTO issued IPER but IPER Sec. V boxes not all 3 YES,	add$690/$345	+0	956/957
☐ → ☐	E. If international preliminary examination fee was paid to USPTO and Rules 492(a)(4) and 496(b) satisfied (IPER Sec. V all 3 boxes YES for all claims),	add $100/$50	+0	962/963
		SUBTOTAL =	$1000	
28.	If Assignment box 19 above is X'd, add Assignment Recording fee of ----$40		+0	(581)
29.	Attached is a check to cover the	**TOTAL FEES**	$1000	

Our Deposit Account No. 03-3975
Our Order No. 82127 (C#) 268453 (M#)

00909

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 and 492 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order Nos. shown above for which purpose a duplicate copy of this sheet is attached.
This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal form is filed

Pillsbury Winthrop LLP
Intellectual Property Group

By Atty: Jack S. Barufka **Reg. No.** 37087

Sig:

Fax: (703) 905-2500
Tel: (703) 905-2012

Atty/Sec: JSB/rsp

NOTE: File in duplicate with 2 postcard receipts (PAT-103) & attachments.

JC20 Rec'd PCT/PTO 02 AUG 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

REQUEST FOR FILING NATIONAL PHASE OF PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495

09/890570

To: Hon. Commissioner of Patents
Washington, D.C. 20231

00909

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

Atty Dkt: P 268453 M# /Client Ref.

From: Pillsbury Winthrop LLP, IP Group:

Date: August 2, 2001

This is a **REQUEST** for **FILING** a PCT/USA National Phase Application based on:

1. International Application	2. International Filing Date	3. Earliest Priority Date Claimed
PCT/IB00/00267	03 February 2000	03 February 1999
⇧ country code	Day MONTH Year	Day MONTH Year (use item 2 if no earlier priority)

4. Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:

(a) ☐ 20 months from above item 3 date (b) ☒ 30 months from above item 3 date,

(c) Therefore, the due date (unextendable) is August 3, 2001

5. Title of Invention PARTIAL IMAGING OF A SUBSTRATE WITH SUPERIMPOSED LAYERS

6. Inventor(s) HILL, Roland G.
and
CLARE, Andrew Walter N.

Applicant herewith submits the following under 35 U.S.C. 371 to effect filing:

7. ☒ Please immediately start national examination procedures (35 U.S.C. 371 (f)).

8. ☒ **A copy of the International Application** as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:

a. ☒ Request;
b. ☒ Abstract;
c. 54 pgs. Spec. and Claims;
d. 17 sheet(s) Drawing which are ☐ informal ☒ formal of size ☒ A4 ☐ 11"

9. ☒ **A copy of the International Application has been transmitted by the International Bureau.**

10. **A translation of the International Application** into English (35 U.S.C. 371(c)(2))

a. ☐ Is transmitted herewith including: (1) ☐ Request; (2) ☐ Abstract;
(3) _____ pgs. Spec. and Claims;
(4) _____ sheet(s) Drawing which are:
☐ informal ☐ formal of size ☐ A4 ☐ 11"

b. ☒ Is not required, as the application was filed in English.

c. ☐ Is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.

d. ☐ Translation verification attached (not required now).

RE: USA National Phase Filing of PCT /IB00/00267

11. ☒ Please see the attached Preliminary Amendment

12. ☐ Amendments to the claims of the International Application **under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., before 18th month from first priority date above in item 3, are transmitted herewith (file only if in English) including:**

13. ☒ PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau

14. ☐ Translation of the amendments to the claims **under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of claim amendments** made before 18th month, **is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered canceled).**

15. **A declaration of the inventor** (35 U.S.C. 371(c)(4))
a. ☐ is submitted herewith ☐ Original ☐ Facsimile/Copy
b. ☒ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.

16. **An International Search Report (ISR):**
a. Was prepared by ☒ European Patent Office ☐ Japanese Patent Office ☐ Other
b. ☒ has been transmitted by the international Bureau to PTO.
c. ☒ copy herewith (2 pg(s).) ☒ plus Annex of family members (1 pg(s).).

17. **International Preliminary Examination Report** (IPER):
a. ☒ has been transmitted (if this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.
b. ☒ copy herewith in English.
c.1 ☒ IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:
c.2 ☒ Specification/claim pages #2-5, 8, 29, 34-35, 38-41, 43, and 48 claims #1-25
Dwg Sheets #3
d. ☐ Translation of Annex(es) to IPER **(required by 30th month due date, or else annexed amendments will be considered canceled).**

18. **Information Disclosure Statement** including:
a. ☒ Attached Form PTO-1449 listing documents
b. ☐ Attached copies of documents listed on Form PTO-1449
c. ☒ A concise explanation of relevance of ISR references is given in the ISR.

19. ☐ **Assignment** document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.

20. ☐ Copy of Power to IA agent

21. ☐ **Drawings** (complete only if 8d or 10a(4) not completed): __ sheet(s) per set: ☐ 1 set informal; ☐ Formal of size ☐ A4 ☐ 11"

22. Small Entity Status ☒ is **Not** claimed ☐ is claimed (**pre**-filing confirmation required)
22(a) ___ (No.) Small Entity Statement(s) enclosed (since 9/8/00 Small Entity Statements(s) not essential to make claim)

23. **Priority** is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) United States of America of:

	Application No.	Filing Date		Application No.	Filing Date
(1)	60/118,480	3 February 1999	(2)		
(3)			(4)		
(5)			(6)		

a. ☒ See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
b. ☐ Copy of Form PCT/IB/304 attached.

PARTIAL IMAGING OF A SUBSTRATE WITH SUPERIMPOSED LAYERS

This invention concerns the partial imaging of a substrate with superimposed layers of marking material in the form of a print pattern with substantially exact registration. This methodology can be used to manufacture vision control panels, especially glass printed with ceramic ink.

A vision control panel may be defined as a light permeable material imaged with a print pattern which subdivides the panel into a plurality of imaged areas and/or a plurality of non-imaged areas. The visual properties of the light permeable material are consequently amended and are typically also dependent upon the illumination conditions on either side of the panel.

One type of vision control panel is a panel comprising a sheet of light permeable material with a design or a single colour visible from one side of the panel which is not visible from the other side of the panel, the design or single colour being superimposed on or forming at least a part of an opaque "silhouette pattern" which subdivides the panel into a plurality of opaque areas and/or a plurality of light permeable areas.

Vision control panels, typically comprising transparent materials partially imaged with a pattern of opaque marking material, are well known. US 4,102,101 (Neilsen et al) discloses toughened glass having a pattern of white ceramic ink dots to form the walls of a squash court. By having relatively bright illumination inside the squash court and relative darkness outside, the wall surface is visible to the players and forms an adequate background against which to sight a squash ball, at the same time allowing visibility inside the court by spectators. This one-way effect is similar to that provided by net curtains or sheers. US 4,321,778 (Whitehead) discloses another type of one-way vision control panel for squash courts, having a layer of black dots, superimposed by white dots, the black dots improving the visibility into the court by spectators and TV cameras. Whitehead discloses in detail methods of manufacturing such panels using ceramic ink waterslide transfers. GB 2 118 096 (Hill and Yule) discloses the protection of white on black dots and other patterns within plastic panels and methods of

forming such white on black patterns. GB 2 165 292 (Hill) discloses panels of transparent or translucent material having a design on one side not visible from the other side, the design being superimposed on or forming a part of a silhouette pattern. Eight basic methods are disclosed in GB 2 165 292 of making such panels. Each of these eight method descriptions typically disclose several variations within each method, an example of each method 1-8 being illustrated in Figs. 18 – 25, respectively, of GB 2 165 292.

Another type of vision control panel is described in WO 97/25213 (Hill) comprising a transparent or translucent sheet and a transparent or translucent "base pattern" of a different colour to the "neutral background" of the sheet. Methods of imaging such panels are disclosed including the imaging of a plurality of projecting surfaces defining the base pattern.

GB 2 174 383 B (Easton and Slavin) discloses methods of decorating glass by means of waterslide transfer.

GB 2 188 873 (Hill) discloses methods and uses for methods of printing superimposed layers with substantially exact registration, including the manufacture of printed circuits and membrane switches, and obtaining the desired colour rendering of ink on non-white substrates and certain backlit illuminated displays, together with fifteen improvements to security printing, labels and seals. These methods rely on the removal of unwanted ink from a printed substrate to leave layers in substantially exact registration.

JP 33723/78 (Kawai), WO 97/15453 (Hill) and WO 98/17480 (Hill and Godden) disclose other methods of partially imaging substrates, including the selective transfer of marking material to preformed or selectively pre-coated substrates. WO 97/47481 (Mueller and Bird) discloses many methods of partially imaging substrates by digital techniques including electrostatic and thermal transfer techniques.

Method 2 of GB 2 165 292 discloses the use of a transfer to form a panel according to the invention and, in particular, the use of a ceramic ink transfer in which the design and silhouette pattern are incorporated into the transfer by "method 1 or any other method," then transferred to glass, the ceramic ink then

being fused into the glass during a toughening process. One "other method" disclosed is method 8 in which a "film material can be punched, burnt, laser cut or otherwise cut normally to achieve a perforated membrane of a grid, net or filigree type of silhouette pattern, the holes of whatever shape forming the transparent areas. The holes may be formed after printing or otherwise applying the required design "blocked out" or the required design may be produced after the holes have been formed . . ." Such perforated sheets or membranes imaged with a design may then be formed within or attached to a transparent sheet. Precision Studios of Stoke-on-Trent, UK, a division of Josiah Wedgwood & Sons Ltd, developed the method according to GB 2165292 of first printing ceramic ink transfer carrier material, the transfer carrier material and the printed ceramic ink then being perforated together. Samples of toughened glass panels produced by such printed then perforated ceramic ink transfers were first made public bearing the Precision Studios' name in 1996. US 5,830,529 (Ross) also discloses the method of perforating ceramic decals.

Other methods of utilising perforated materials to form partially imaged panels according to GB 2 165 292, for example, for advertising on the windows of buses, taxis and retail outlets, typically manufactured by screen or digitally printing a design on a pre-perforated self-adhesive vinyl assembly, have been in widespread use since 1993. US 5,609,938 (Shields) and US 5,773,110 (Shields) both disclose a perforated clear facestock material and an additional solid backing liner which have been incorporated into products made and sold since September 1993 by Visual Technologies, Inc. of Pineville, North Carolina, USA, as evidenced and available for public inspection in the reissue of US 5,609,938 (Shields) file serial number 09/267,025 at the US Patent and Trademark Office

GB 2 118 096 (Hill and Yule), GB 2 165 292 and US 5,830,529 also disclose the edge alignment of superimposed layers, by means of applying layers to a projecting surface which automatically aligns their perimeters with the downstand edge of the projecting surface, and by means of a recessed surface which automatically aligns the layer perimeters to the upstanding edge.

International Patent Application WO 98/43832 (Pearson) discloses the partial imaging of a transparent glass substrate by means of a perforated decal on a

carrier. In PCT/GB98/00803, the word "perforated" is used to mean having a plurality of holes, not limited to a process of piercing through a material. PCT/GB98/00803 discloses and claims the methodology of heat release transfers being automatically applied and also discloses three methods of forming vision control panels using an unperforated ceramic heat release transfer. One of these methods is the combination of method 2 in GB 2 165 292 with previously known ceramic ink heat release transfer technology. Another is GB 2 165 292 method 4 (stencil method) in conjunction with previously known ceramic ink heat release transfer technology, which is used to transfer ink layers over a stencil printed directly onto a glass sheet. In addition, WO 98/43832 discloses the selective application of a heat release layer to a ceramic ink heat release transfer carrier, intended to facilitate the selective application of ceramic ink to a sheet of glass as a means of manufacturing vision control panels. In all the methods of WO 98/43832, the ceramic ink is removed from the transfer carrier by means of a uniform layer of heat-activated adhesive.

Contra Vision Supplies Ltd of Stockport, UK and Precision Studios developed a process of using unperforated ceramic ink transfers by a combination of GB 2 165 292 methods 2 and 1, the latter as improved by the 'Through Combination Method' of WO 97/15433 (Hill), and a resultant vision control panel was placed in the public domain in the USA and Australia in March 1998 and exhibited at the Glastec '98 exhibition in Dusseldorf, Germany, in September 1998.

GB 2 165 292 method 1 and the 'Through Combination Method' of WO 97/15433, as used to make these disclosed panels, do not produce a design superimposed on a silhouette pattern with substantially exact registration. These combined methods of partially imaging a substrate enable an acceptable vision control panel to be made in spite of the errors in registration of conventional methods of printing, such as screenprinting.

While vision control panels having multiple layers of ink in substantially exact registration can be made by means of perforated transfers, the method has the disadvantage of the reduction in strength of the perforated material caused by the holes. During the transfer process, this leads to difficulties in applying the

perforated decal or perforated decal and perforated decal carrier to a sheet of glass, the transferred material being liable to rupture and folding, both of which spoil the finished appearance of the panel. Additionally, such difficulties severely limit the size of perforated material that can be transferred to a sheet of glass. Also, the perforation of ceramic ink decals by mechanical punching is expensive because the punching tools become relatively worn because of the presence of glass 'frit' (finely ground glass) in the ceramic ink.

The stencil method disclosed in WO 98/43832 has the disadvantage of requiring the separate process of the application of the stencil pattern to a sheet of glass prior to the application of the transferred ceramic material. Printing directly onto glass is a cumbersome and time-consuming process, primarily owing to the difficulties of handling heavy glass panels. Transfer processes of printing on glass have been developed and adopted for this reason and because it is possible to print successive applications of ink in better registration onto a decal carrier than onto a large sheet of glass.

The selective application of a heat release agent to a ceramic ink heat release transfer carrier, as disclosed in WO 98/43832, does not result in a practical process. The heat applied to the paper surface to melt the heat release agent and activate the heat-activated adhesive on the other side of the transfer must heat all the heat-activated adhesive. The desired ink is supposed to be selectively transferred to the glass, leaving the unwanted ink on the transfer carrier. No indication is given as to how this method is supposed to work. The heat-activated adhesive is uniformly applied over the ceramic ink on the transfer and the heat is uniformly applied in the transfer machine by heated roller and optionally by pre-heated glass and therefore the adhesive uniformly adheres the ink to the glass. The adhesion of the ceramic ink to the carrier and the internal adhesive strength of the ceramic ink would need to be sufficient to enable an ink fracture mechanism and to overcome the adhesion of the ink to the glass outside the areas of the heat release agent in order for ink that is unwanted on the substrate to be retained on the decal carrier. Even assuming this method could be made to work, in spite of the overall layer of heat-activated adhesive, the resultant edges of the transferred pattern would be irregular owing to "underbreak" or "overbreak" of

Typical substrates onto which ceramic decals are transferred include ceramic holloware, ceramic flatware, hollow glassware and flat glass.

Ceramic ink typically comprises glass "frit," metal oxide pigments and a binding medium of solvent, resin and plasticiser. Ceramic ink may contain an oil, such as pine oil. Ceramic inks can be opaque or translucent.

All the above transfer materials and methods are well known in the art.

Many automatic methods of decal application have been devised, for example all the mechanical processes, firing ovens and furnaces described in WO 98/43832 were well known in the art before the priority date of that patent application.

After ceramic ink is applied to a normal sheet of flat glass, sometimes referred to as float glass and sometimes referred to as annealed glass, the printed sheet of glass is then typically subjected to a thermal regime of up to a temperature of typically 570°C, which burns off all components of the ceramic ink other than glass frit and pigment and melts the glass frit and fuses the remainder of the ink onto the glass, typically followed by relatively slow cooling to anneal the glass once again, which process will be referred to as an ink fusing regime. Optionally, annealed glass substrates with ceramic ink can undergo a tempering or toughening regime, which involves raising the glass temperature to typically between 670°C and 700°C, in which temperature range the glass is relatively soft, and then cooling it relatively quickly, typically by cold air quenching. This causes differential cooling of the glass sheet, the two principal surfaces solidifying before the core solidifies. The subsequent cooling and shrinkage of the core causes a zone of precompression adjacent to each principal surface. The physical strength properties of the glass sheet are fundamentally changed by this glass tempering or toughening regime, which imparts a considerably improved flexural strength to the resultant tempered or toughened glass.

Such a glass tempering or toughening regime may be carried out after a separate ink fusing regime or as one process, the ink being fused onto the glass as part of that one process.

more "spot" colour layers, a multi-colour printing process such as a four colour process, a five colour process or a hexachrome process, or a combination of any of these, for example a four colour process with an additional one or more "spot" colour layers. The marking material layers can be applied by any means, for example coated, screenprinted, litho printed, digitally printed, for example by a digital ink jet printer, sprayed or air brushed.

In all the above methods using ceramic ink, it can be advantageous to introduce one or more interlayers of clear glass flux or glass frit with a clear medium, typically of solvent, resin and plasticiser (essentially a clear ceramic ink with no pigments), to separate layers of differently coloured ceramic ink, to reduce the risk of these becoming intermixed during firing. Such additional interlayers are particularly beneficial between the black and white and white and coloured layers used to form vision control panels, to assist the production of separate, opaque ceramic ink layers. It can also be advantageous to introduce single or multiple layers of covercoat and/or downcoat and/or one or more binding layers between successive layers of marking material, to assist decal transfer, perforation or other decal treatment. US 5,830,529 and WO 98/43832 only refer to producing perforated layers of ceramic ink, in which the ink is interconnected and thus has an overall tensile or membrane strength. The methods outlined herein enable the production of dot, line and other print patterns comprising discrete elements which may be held in the desired spatial relationship and satisfactorily transferred in large size transfers, even considerably greater than the industry standard of typically 80 cm x 60 cm.

While the above methods are described principally in relation to ceramic ink transfers, they are applicable to the transfer of other types of marking material, onto glass or other substrates, such as the transfer of organic inks onto plastic sheet materials, a subsequent curing regime or heat treatment being typically applied to suit the particular type of ink and substrate.

Also, it should be understood that the invention is applicable to other permutations of known transfer technology, for example a direct transfer could have a water-soluble adhesive and a water-soluble release layer, or a heat-activated adhesive and a water-soluble release layer, or a water-soluble adhesive

This type of suction deck apparatus can also be adopted for the application of direct transfers, in which the decal is retained on the decal carrier until the decal is applied to the surface of the substrate. For the application of heat release transfers, hot air is introduced into the plenum to activate the heat release agent and heat-activated adhesive. Alternatively the suction deck may be heated by other means, for example conduction through a suitable skin material, such as aluminium. The substrate, for example glass, may optionally be preheated. If the suction deck is suitably supported, overall pressure can also be applied to the transferred material. Optionally, radiant heat may subsequently be applied, preferably onto a decal carrier having a black surface on the side remote from the ceramic ink. Alternatively, a glass sheet and pre-positioned decal may be passed through heated rollers before removing the transfer carrier.

Optionally, the suction deck is equipped with a vibrating device, for example comprising an eccentrically weighted rotating element, for example driven by electric motor attached to the structure of the suction deck. The resultant vibration assists release of one surface from another, for example of a suction held decal from its carrier.

Perforated decals can be handled by the suction deck after the addition of a non-perforated layer to the perforated decal carrier and/or decal to be transferred, the non-perforated layer typically being a self-adhesive film material.

All the above methods numbered 1.1 to 6 are advantageous over the prior art. They are unified by the means of removing marking material from a base layer by means of a selectively applied force over the area of the base layer. The force is applied by a means which does not form a substantial part of the resultant partially imaged substrate. This selectively applied force typically defines the print pattern.

The above methods are all advantageous over the stencil method of WO 98/43832, which requires the printing of two different surfaces, a decal and a sheet of glass, as well having the handling difficulty and relative inaccuracy of printing a pattern onto glass, particularly if the glass is of large size.

The WO 98/43832 method of selective application of heat release agent within a heat release transfer is clearly impractical, as previously described, and would not enable an accurate silhouette pattern to be formed. Even if a combination of ink strength, adhesion of the heat-activated adhesive to the glass and ink and adhesion of the ink to the carrier could be found to make the method work, the force to remove the ink from the carrier would be uniformly (not selectively) applied by the uniform layer of adhesive, leading to an imprecise print pattern.

Thus all the methods described distinguish and distinguish advantageously over the prior art methods.

These methods will now be described by way of example with reference to the accompanying figures, in which similar parts of different embodiments have been given the same reference numerals, and in which :-

Figs. 1A, B, C, D, E, F and G are cross-sections through a base layer printed with a plurality of initial layers of marking material.

All Figs. 2A to 13J are diagrammatic and not-to-scale sequential cross-sections through the stages of the above method variants 1.1 to 6, respectively. Figs. 14 A and B are partial are cross-sections through a stressed skin suction deck and Figs. 14C and D are plan views illustrating the use of a stressed skin suction deck in applying decals to a sheet of substrate material.

Fig.1A shows a plurality of initial superimposed layers of marking material shown diagrammatically simplified as 10, applied to base layer 20.

Within all the variants of the method of the invention, initial superimposed layers of marking material 10 are applied in layers which may be described as "blocked out" or "solid", being applied in continuous layers with no attempt to produce the ultimately desired print pattern, typically referred to herein as initial layers. Portions of these layers are subsequently removed to ultimately form a substrate partially imaged with a print pattern of layers of marking material superimposed with substantially exact registration, the unimaged area(s) being where the portions of marking material have been previously removed. The initial

layers 12 and 14 have also fused to form a durable ceramic ink print pattern that will withstand considerable wear and tear, the resultant vision control panel 60 being suitable, for example, for a building window, partition or other architectural glass panel.

Figs. 3A-D illustrate method 1.2 which is similar to method 1.1 but in which the initial superimposed layers of marking material 10 are pre-cut as illustrated in Fig. 3A with incisions 11, for example by means of an array of blades fixed to a moveable frame. The incisions assist the removal of unwanted ink, for example individual chisels or other scraping devices 34 can be narrower than the width of removed portions 28 in Fig. 3B, owing to the membrane tensile strength of the marking material layers 10. The residual marking material 10 and base layer 20 shown in Fig. 3B can then be processed as described for method 1.1, to leave substrate 30 having a substantially different material property to base layer 20, as shown in Fig. 3C. In the manufacture of a vision control panel, Fig. 3D shows incisions 11 in ceramic ink layers 12, 14 and 16 assisting in the removal of unwanted ink to leave the desired print pattern layers of ceramic ink 12, 14 and 16 in substantially exact registration leaving unimaged areas 28 on glass sheet 40, as shown in Fig. 3E. The glass and ceramic ink can then be processed as described for method 1.1, to leave tempered glass 50 and fused ceramic ink layers 12,14 and 16 in Fig. 3F.

Figs. 3G – J illustrate method 1.3 in which a base layer 20 is first applied to substrate 35 before the application of the initial superimposed layers of marking material 10, as illustrated in Fig. 3G. The unwanted marking material is removed by one of the methods included in method 1.1, to produce the layers of marking material and base layer in the required print pattern superimposed in substantially exact registration, leaving unimaged areas 28, as shown in Fig. 3H. In the manufacture of certain products, for example a vision control panel, the base layer 20 is advantageously a frangible clear material which does not need to be completely removed from glass substrate 40, as illustrated in Fig. 3I. When the glass sheet 40 is subject to a glass tempering regime, this base layer 20 is burnt off, leaving the layers of ceramic ink 10 in the form of the desired print pattern superimposed in substantially exact registration with unimaged areas 28 on a

tempered glass sheet, as illustrated in Fig. 3J. The tempered glass sheet 50 has substantially different material properties to glass sheet 40, including greatly increased flexural strength.

Fig. 3K illustrates method 1.4, which is similar to method 1.3, except that the layers of marking material 10 and preferably the base layer 20 are pre-cut with incisions 11 to assist the removal of the unwanted ink from the substrate 30. Fig. 3L shows the unwanted ink removed. In the tempering process, the base layer 20 is burnt off, leaving the vision control panel as in Fig. 3J.

Figs. 4 A-F illustrate methods 1.5 and 1.6 using direct transfers. In Fig. 4A, illustrating the manufacture of a vision control panel, the base layer 23 is a direct ceramic ink heat release decal carrier 23 comprising a sealed paper, a heat release layer such as a wax, to which may be added an optional covercoat 36, preferably non-film-forming, onto which initial superimposed layers of ceramic ink 10 are applied, followed by heat-activated adhesive layer 22. Fig. 4B illustrates the unwanted ceramic ink and adhesive removed by a mechanical means, for example one of those described in method 1.1. According to method 1.6, the ink removal is assisted by pre-cut incisions 11, as shown in Fig. 4C. It has been found that pre-cutting the adhesive layer, the ceramic ink layers and the optional covercoat layer 36 enables the clean removal of unwanted ink, for example using an array of chisels which may be of less width than the width of the unimaged areas 28, as the membrane tensile strength of the ink and the supporting "raft" effect of covercoat 36 ensures the ink is removed cleanly up to the pre-cut edges, as illustrated in Fig. 4B. Fig. 4D shows the decal directly applied to a glass sheet 40, for example by heated rollers or a heated platten. The heat release layer is activated, together with the heat activated adhesive, enabling the removal of the decal carrier. Fig. 4E shows the decal carrier removed, leaving the print pattern of superimposed layers of ceramic ink in substantially exact registration, with unimaged areas 28.

The layers of ceramic ink and adhesive transferred onto glass substrate sheet 40 are subjected to an ink fusing or a glass tempering regime, in which the ceramic ink is fired onto the glass 50, as shown in Fig. 4F.

Figs. 5A-F illustrate methods 1.5 and 1.6 using indirect waterslide decal carrier 25 in Fig. 5A with optional downcoat 38, and initial superimposed ceramic ink layers 12, 14 and 16. Fig. 5C shows the unwanted ink removed by mechanical means to leave the unimaged areas 28. Optionally, the decal layers are pre-cut according to method 1.6, as illustrated in Fig. 5B with incisions 11, to assist removal of the unwanted ink. In Fig. 5D a covercoat 36 is applied, typically a methacrylate lacquer to complete decal 27. Fig. 5E shows the decal 27 transferred to glass sheet 40 after wetting the transfer assembly of Fig. 5D and removing the decal carrier 25. In Fig. 5F, the decal 27 and glass sheet 40 have been subjected to a glass tempering regime, burning off downcoat 38 and covercoat 36, leaving ceramic ink layers 12, 14 and 16 fused into tempered glass 50 in the required print pattern in substantially exact registration.

Figs. 6A to 7D illustrate methods 2.1 to 2.5, in which unwanted marking material is removed by means of a heated profiled roller. In Figs. 6A-C illustrating methods 2.1 and 2.2, direct decal carrier 23 has a heat release layer, is optionally provided with a covercoat 36, preferably non-film-forming, and is printed with initial superimposed marking material layers 10 and heat-activated adhesive 22. This transfer assembly is passed between rollers 26 and 29, roller 26 being a heated profiled roller with projections, typically cylindrical projections to create a print pattern of lines. Roller 29 has a conventional, smooth surface. Heated profiled roller 26 activates the adhesive 22 and heat release layer, thus removing the unwanted marking material to leave unimaged areas 28 and a decal

in the required print pattern, as illustrated in Fig. 6B. According to method 2.2, as shown in Fig. 6C, the initial superimposed layers are first pre-cut with incisions 11 to assist removal of unwanted marking material, in which case the width of the projecting cylindrical elements of heated roller 26 can be less than the width of marking material removed in Fig. 6B. In the manufacture of a tempered glass vision control panel, the decal is then transferred to a sheet of glass 40 as previously shown in Fig. 4D and the process is completed as previously described according to Figs. 4E and 4F, to leave fused ceramic ink layers 10 in the required print pattern with substantially exact registration on tempered glass 50.

Figs. 7A-D illustrates methods 2.3, 2.4 and 2.5, in which a heated profiled roller is used to selectively transfer the desired print pattern of marking material onto a substrate from a direct transfer decal carrier. Fig. 7A illustrates method 2.3, which is a conventional direct ceramic ink heat release transfer process except that heated roller 26 is profiled to the desired print pattern. Passing between heated profiled roller 26 and plain roller 29 is a direct ceramic ink decal carrier 23, with a heat-release layer 2, initial superimposed layers of ceramic ink 10 and heat-activated adhesive 22. This direct transfer assembly is pressed together with glass sheet 40, whereupon the heat release layer 2 and adhesive 22 are selectively activated across the area of the print pattern by the heated profiled roller 26. An ink fracture mechanism enables the print pattern to be deposited by the selectively activated adhesive force, while the unwanted ink is selectively pulled away from the glass sheet by the decal carrier where the heat release agent is not activated. As shown in Fig. 7B, the desired print pattern of superimposed layers of ceramic ink 10 and adhesive 22 are left in substantially exact registration, leaving unimaged portions 28. Fig. 7C illustrates method 2.4, which is similar to 2.3, except that the edges of the print pattern are defined by pre-cut incisions 11. This allows the heated profiled roller surface to be of less width than the areas 28 to be unimaged in the resultant arrangement of Fig. 7B, allowing a practical tolerance in the "set up" of a pre-cutting and transfer production line. Fig. 7D illustrates method 2.5, which is similar to method 2.3 except that the heat-activated adhesive layer 22 is selectively applied to the initial superimposed layers of ceramic ink 10, to accurately define the desired print pattern in the resultant arrangement of Fig. 7B. In each of methods 2.3, 2.4 and 2.5, the transferred ceramic ink layers 10,

glass 50. While methods 3.2 and 3.3 primarily are intended for the use of direct transfers, an indirect transfer system can use the same methods if the functions of transfer release and adhesive are separated, for example the adhesive system being heat-activated whereas the release mechanism is water-activated.

Figs. 9A and B illustrate method 4.1 utilising a direct transfer decal 23 but with a selectively applied heat release layer 24 in the form of the required silhouette pattern. To this is applied initial superimposed marking material layers 10, continuous heat-activated adhesive 22 and a stencil of the desired print pattern 31. This direct transfer assembly is applied to a substrate by means of heated roller 39 and roller 29, whereupon only the print pattern and adhesive outside the stencil is transferred to the substrate. In the manufacture of a vision control panel, ceramic ink layers 10 are applied in the required print pattern to glass sheet 40 by adhesive 22, which is selectively blocked from the glass sheet 40 by the stencil 31. Fig. 9B shows the required silhouette pattern transferred onto glass sheet 40, which may then be subjected to a glass tempering regime, to result in the arrangement of Fig. 4F with ceramic ink layers 10 in the form of the required print pattern superimposed with substantially exact registration and fused onto tempered glass 50.

Figs. 9C and D illustrate method 4.2, which is similar to method 4.1 except that the heat-release layer 24 is continuous, therefore effecting the complete transfer of initial superimposed layers 10, as illustrated in Fig. 9D. The stencil 31 and unwanted adhesive and ink above it are then removed, for example by virtue of stencil 31 being heat expandable. The removal of unwanted material is completed, for example by vacuum suction, leaving the arrangement of Fig. 9B, which may optionally be converted into the toughened glass vision control panel of Fig. 4F, as previously described. Fig. 9E illustrates method 4.3, which is similar to 4.2, except that the heat expandable stencil layer 31 is intermediate the initial superimposed layers of ceramic ink 10 and the heat-activated adhesive 22. The unwanted ink is then removed as in method 4.2. With this method it is important that any residual stencil material adhered to the adhesive 22 is also burnt off in the process of glass tempering.

see the design. Alternatively, there may be one design facing outwards and one design facing inwards. Alternatively, the vision control panel can be according to WO 97/25213, having a translucent base pattern so that the design is at least in part illuminated by the candle flame but the flame is clearly visible through the design immediately in the line of sight of the flame.

As further examples the methods may be used for security printing, labels and seals, for example as improvements over the embodiments described in GB 2 188 873, and for a variety of display panels.

CLAIMS:

1. A method of imaging an imperforate substrate on a substantially uniform imaging surface of said substrate so as to provide said substrate with a print pattern, said print pattern comprising at least two superimposed layers of marking material and being defined by means of 1) said substrate having at least one of said at least two layers of marking material on first portions of said substrate and 2) said substrate being devoid of both of said at least two layers of marking material on other portions of said substrate, said at least two superimposed layers of marking material having at least one length of common boundary within said print pattern, said method including applying at least two initial, continuous, superimposed layers of said marking material onto a substantially imperforate base layer and removing portions of said initial, continuous, superimposed layers of said marking material from said base layer, while maintaining the imperforate nature of said base layer, by means of a force selectively applied to said marking material while said marking material is being supported by said base layer, and wherein said substrate has at least one substantially different material property to said base layer, and wherein at least one of said at least two layers of marking material is applied to said substrate with a surface thereof directly in contact with said imaging surface of said substrate.

2. A method as claimed in claim 1, wherein said at least two layers of marking material are transferred from said base layer to said substrate.

3. A method as claimed in claim 1, wherein said force is selectively applied to a surface of said marking material remote from said base layer.

4. A method as claimed in claim 1, wherein said marking material is transferred from said base layer to said imaging surface of said substrate such that said at least one of said at least two layers of marking material is directly in contact with said imaging surface of said substrate.

5. A method as claimed in claim 1, wherein said base layer is a decal carrier and said at least two initial superimposed layers of said marking material are applied to said decal carrier; parts of said at least two initial superimposed layers of marking material are removed from said decal carrier such that a decal is formed on said decal carrier by non-removed parts of said at least two initial superimposed layers of marking material; and said decal is transferred from said decal carrier to said substrate.

6. A method as claimed in claim 5, wherein said removed parts of said at least two initial superimposed layers of said marking material are removed from said decal carrier before said non-removed parts of said at least two layers of marking material are transferred to said substrate.

7. A method as claimed in claim 1, wherein said substrate is light permeable, and one layer of said at least two layers of marking material is of one colour and the other layer of said at least two layers of marking material is of another colour, and wherein said one layer of said one colour is visible from one side of said substrate and is not visible from the other side of said substrate.

8. A method as claimed in claim 1, wherein said base layer is transmuted into said substrate by application of energy.

9. A method as claimed in claim 8, wherein said energy is thermal energy.

10. A method as claimed in claim1, wherein said force is a cutting force applied to said at least two initial superimposed layers of said marking material along said at least one length of common boundary of said print pattern.

11. A method as claimed in claim 1, wherein said force is a scraping force.

12. A method as claimed in claim 1, wherein said force is applied by a heated profiled roller, said heated profiled roller having recessed portions from an otherwise cylindrical surface.

13. A method as claimed in claim 12, wherein said at least two initial superimposed layers of marking material are applied to a decal carrier , and said heated profiled roller is applied to a surface of said at least two initial superimposed layers of marking material remote from said decal carrier.

14. A method as claimed in claim 1, wherein said base layer has a primary surface to which said marking material is applied, and wherein said primary surface of said base layer comprises a substantially uniform material.

15. A method as claimed in claim 1, wherein said base layer has a primary surface to which said marking material is applied, and wherein said primary surface of said base layer comprises a plurality of materials.

16. A method as claimed in claim 1, wherein said base layer comprises a substantially different chemical composition than the chemical composition of said substrate.

17. A method as claimed in claim 5, wherein said non-removed parts of said at least two initial superimposed layers of said marking material are transferred by means of a selectively applied suction force.

18. A method as claimed in claim 17, wherein said selectively applied suction force is applied to a surface of said decal remote from said decal carrier.

19. A method as claimed in claim 17, wherein said selectively applied suction force is applied to a surface of said decal carrier remote from said decal.

20. A method as claimed in claim 1, wherein said substantially uniform imaging surface is plane.

21. A method as claimed in claim 1, wherein any cross-section through said substantially uniform imaging surface is of single curvature.

22. A method of imaging an imperforate substrate on a substantially uniform imaging surface of said substrate so as to provide said substrate with a print pattern, said print pattern comprising at least two superimposed layers of marking material and being defined by means of 1) said substrate having at least one of said at least two layers of marking material on first portions of said substrate and 2) said substrate being devoid of both of said at least two layers of marking material on other portions of said substrate, said at least two superimposed layers of marking material having at least one length of common boundary within said print pattern, said method including applying at least two initial, continuous, superimposed layers of said marking material onto a substantially imperforate base layer and removing portions of said initial, continuous, superimposed layers of said marking material from said base layer, while maintaining the imperforate nature of the base layer, by means of a force selectively applied to said marking material while said marking material is being supported by said base layer and wherein said substrate has at least one substantially different material property to said base layer, and transferring marking material remaining on said base layer to said first portions of said substrate, and wherein at least one of said at least two layers of marking material is applied to said substrate with a surface thereof directly in contact with said imaging surface of said substrate.

23. A method of imaging an imperforate substrate on a substantially uniform imaging surface of said substrate so as to provide said substrate with a print pattern, said print pattern comprising at least two superimposed layers of marking material and being defined by means of 1) said substrate having at least one of said at least two layers of marking material on first portions of said substrate and 2) said substrate being devoid of both of said at least two layers of marking material on other

portions of said substrate, and said at least two superimposed layers of marking material having at least one length of common boundary within said print pattern, said method including applying at least two initial, continuous, superimposed layers of said marking material onto a base layer, transferring said at least two initial, continuous, superimposed layers of said marking material to said substrate by means of a force selectively applied to said marking material while said marking material is being supported by said base layer, and wherein said substrate has at least one substantially different material property to said base layer, and removing portions of said initial, continuous, superimposed layers of said marking material from said substrate, and wherein at least one of said at least two layers of marking material is applied to said substrate with a surface thereof directly in contact with said imaging surface of said substrate.

24. A method of imaging an imperforate substrate on a substantially uniform imaging surface of said substrate so as to provide said substrate with a print pattern, said print pattern comprising at least two superimposed layers of marking material and being defined by means of 1) said substrate having at least one of said at least two layers of marking material on first portions of said substrate and 2) said substrate being devoid of both of said at least two layers of marking material on other portions of said substrate, and said at least two superimposed layers of marking material having at least one length of common boundary within said print pattern, said method including applying a base layer to said imaging surface of said substrate, applying at least two initial, continuous, superimposed layers of said marking material onto said base layer, and removing portions of said initial, continuous, superimposed layers of said marking material from said base layer by means of a force selectively applied to said marking material while said marking material is being supported by said base layer, and wherein said substrate has at least one substantially different material property to said base layer, and wherein said base layer is removed from said substrate, and at least one of said at least two layers of marking material is applied to said substrate with a

surface thereof directly in contact with said imaging surface of said substrate.

25. A method of forming an imperforate transmuted substrate having a print pattern on a substantially uniform imaging surface of said transmuted substrate, said print pattern comprising at least two superimposed layers of marking material and being defined by said transmuted substrate 1) having at least one of said at least two layers of marking material on first portions of said transmuted substrate and 2) said transmuted substrate being devoid of both of said at least two layers of marking material on other portions of said transmuted substrate, and said at least two superimposed layers of marking material having at least one length of common boundary within said print pattern, said method including applying at least two initial, continuous, superimposed layers of said marking material onto a starting substrate and removing portions of said initial, continuous, superimposed layers of said marking material from said starting substrate by means of a force selectively applied to said marking material while said marking material is being supported by said starting substrate, and wherein said starting substrate is transmuted by means of energy applied to said starting substrate such that the transmuted substrate has at least one substantially different material property than said starting substrate, and wherein at least one of said at least two layers of marking material is applied to said starting substrate with a surface thereof directly in contact with a surface of the starting substrate that is transmuted into said imaging surface of said transmuted substrate.

13.

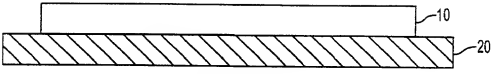

FIG.1A

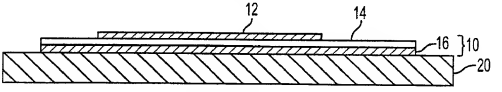

FIG.1B

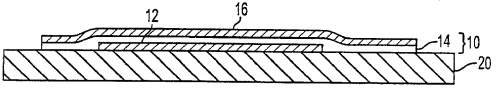

FIG.1C

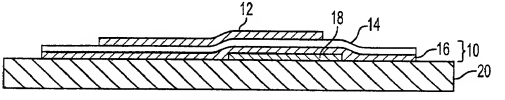

FIG.1D

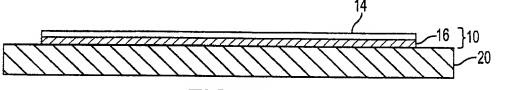

FIG.1E

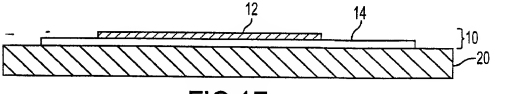

FIG.1F

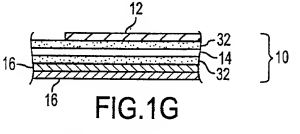

FIG.1G

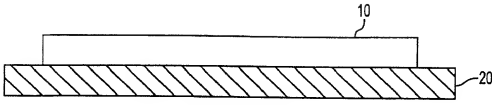

FIG. 2A

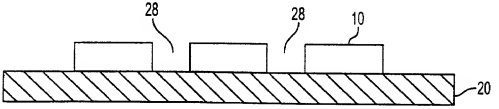

FIG. 2B

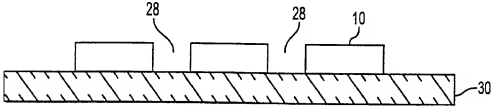

FIG. 2C

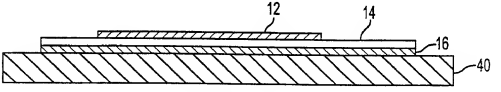

FIG. 2D

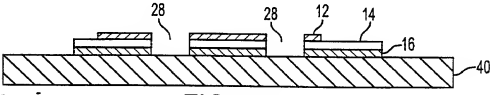

FIG. 2E

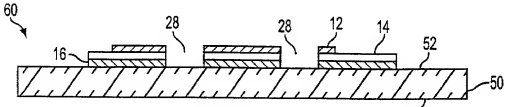

FIG. 2F

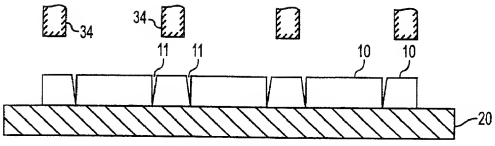

FIG. 3A

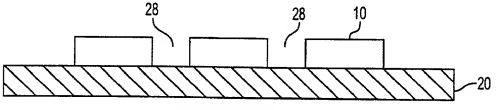

FIG. 3B

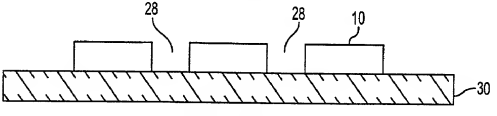

FIG. 3C

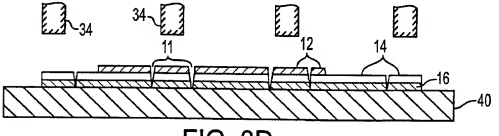

FIG. 3D

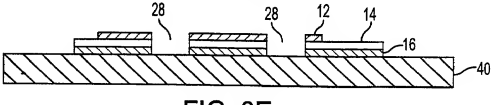

FIG. 3E

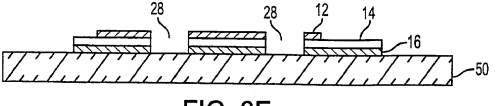

FIG. 3F

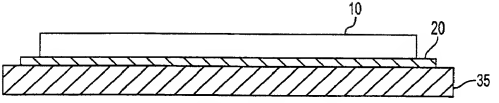

FIG. 3G

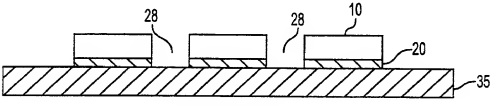

FIG. 3H

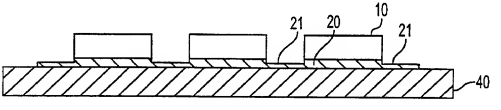

FIG. 3I

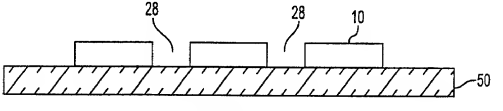

FIG. 3J

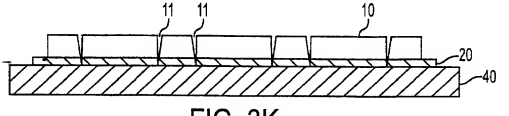

FIG. 3K

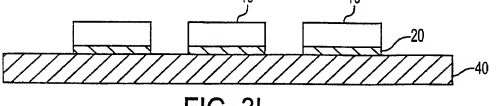

FIG. 3L

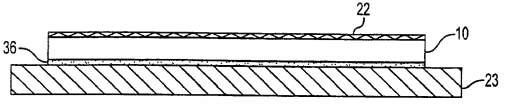

FIG. 4A

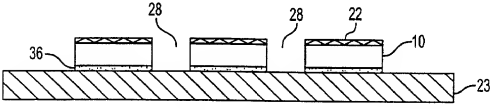

FIG. 4B

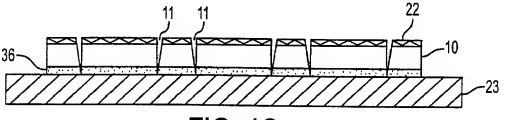

FIG. 4C

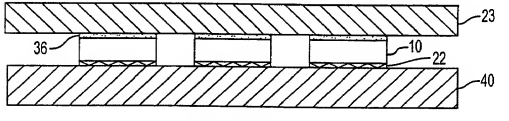

FIG. 4D

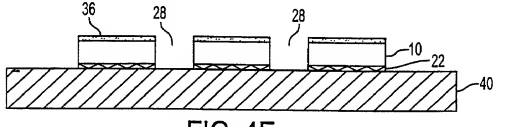

FIG. 4E

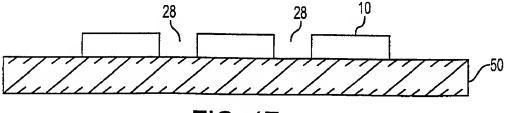

FIG. 4F

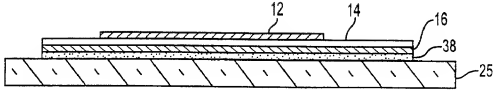

FIG. 5A

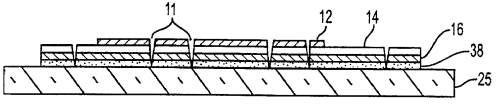

FIG. 5B

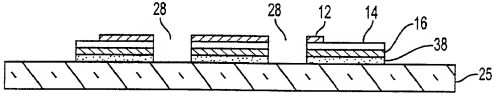

FIG. 5C

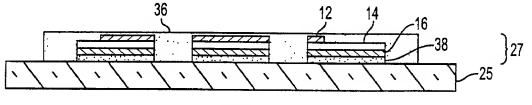

FIG. 5D

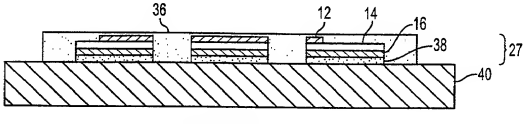

FIG. 5E

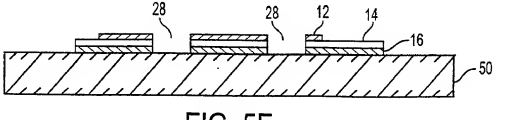

FIG. 5F

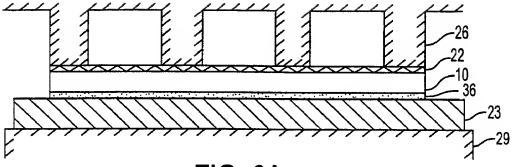

FIG. 6A

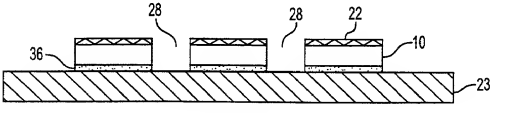

FIG. 6B

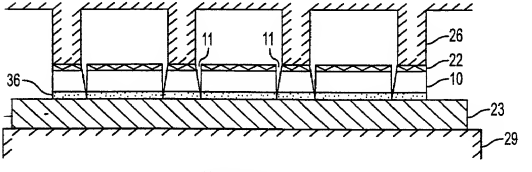

FIG. 6C

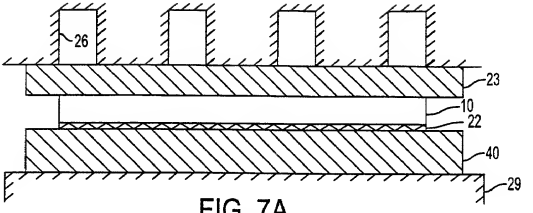

FIG. 7A

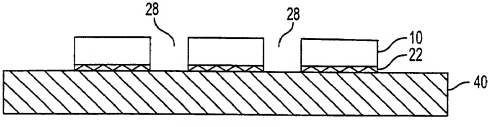

FIG. 7B

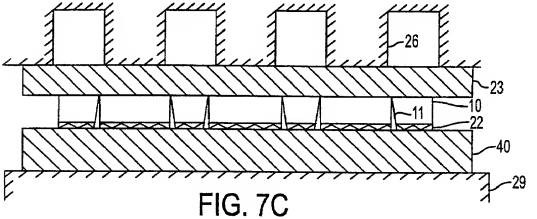

FIG. 7C

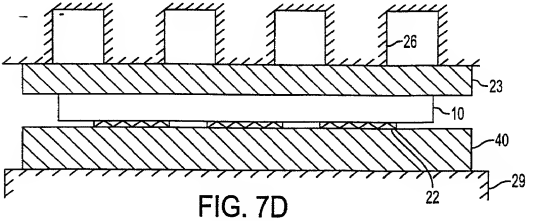

FIG. 7D

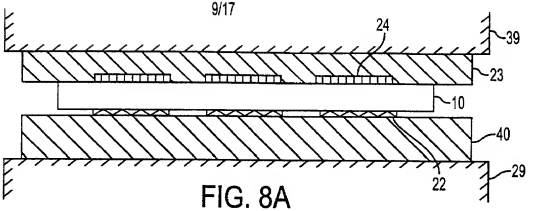

FIG. 8A

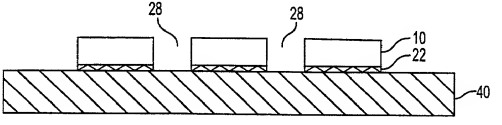

FIG. 8B

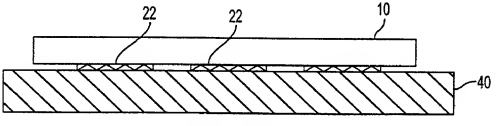

FIG. 8C

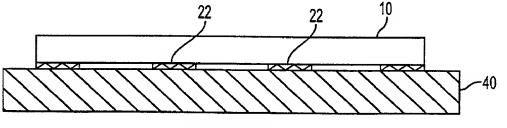

FIG. 8D

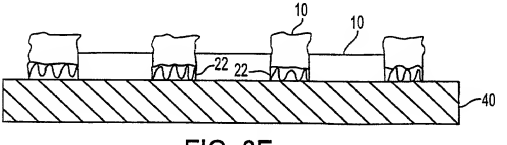

FIG. 8E

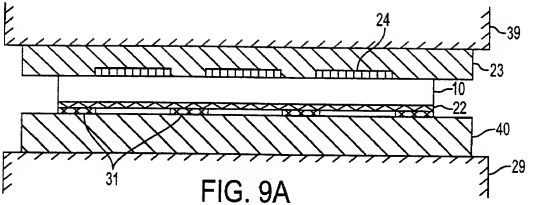

FIG. 9A

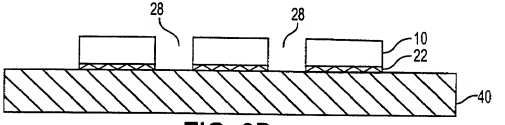

FIG. 9B

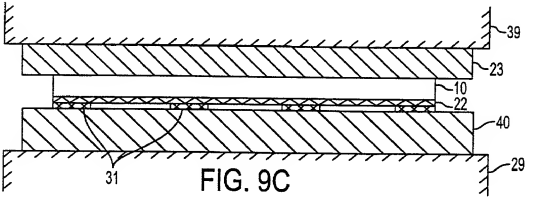

FIG. 9C

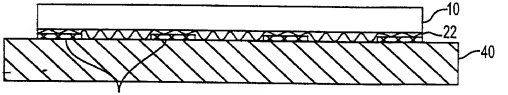

FIG. 9D

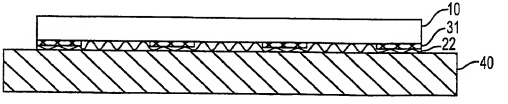

FIG. 9E

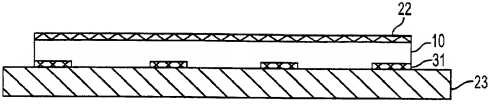

FIG. 10A

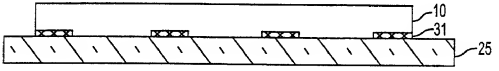

FIG. 10B

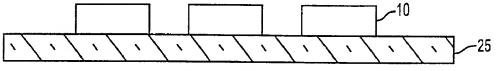

FIG. 10C

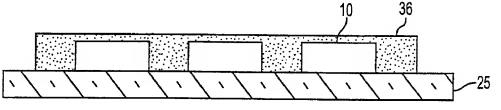

FIG. 10D

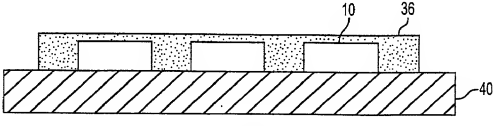

FIG. 10E

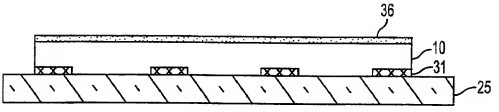

FIG. 11A

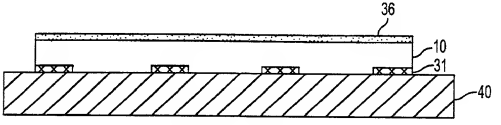

FIG. 11B

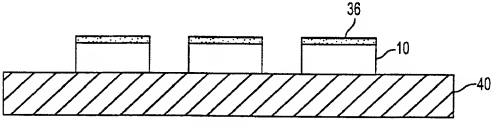

FIG. 11C

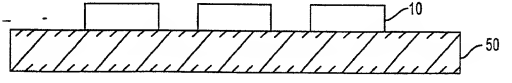

FIG. 11D

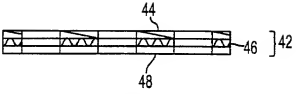

FIG. 12A

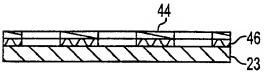

FIG. 12B

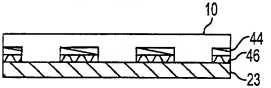

FIG. 12C

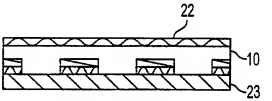

FIG. 12D

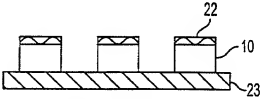

FIG. 12E

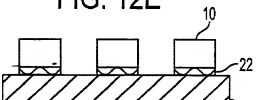

FIG. 12F

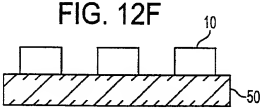

FIG. 12G

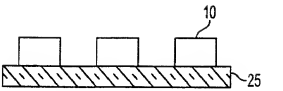

FIG. 12H

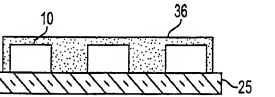

FIG. 12J

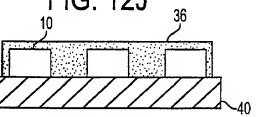

FIG. 12K

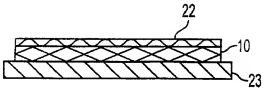

FIG. 13A

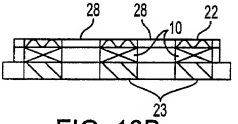

FIG. 13B

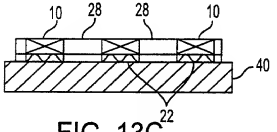

FIG. 13C

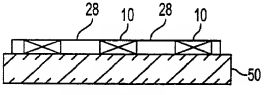

FIG. 13D

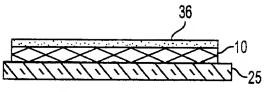

FIG. 13E

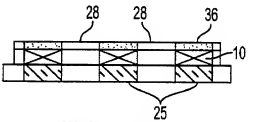

FIG. 13F

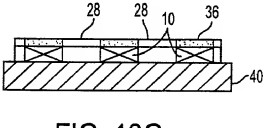

FIG. 13G

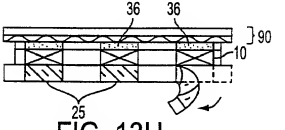

FIG. 13H

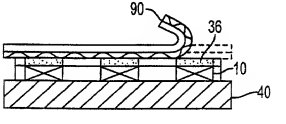

FIG. 13J

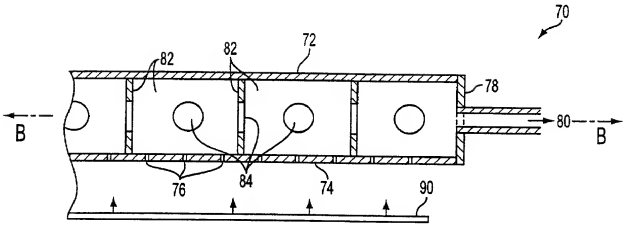

FIG. 14A

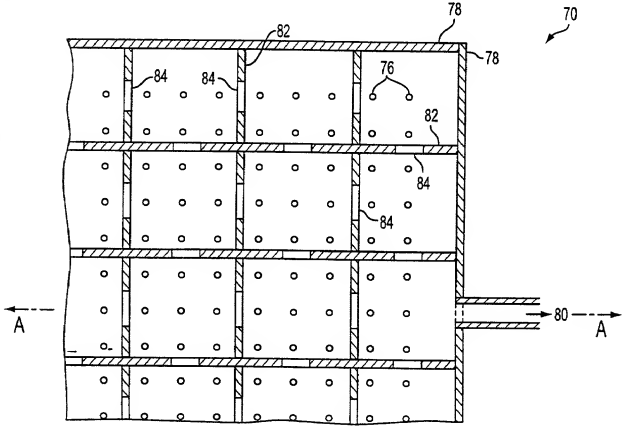

FIG. 14B

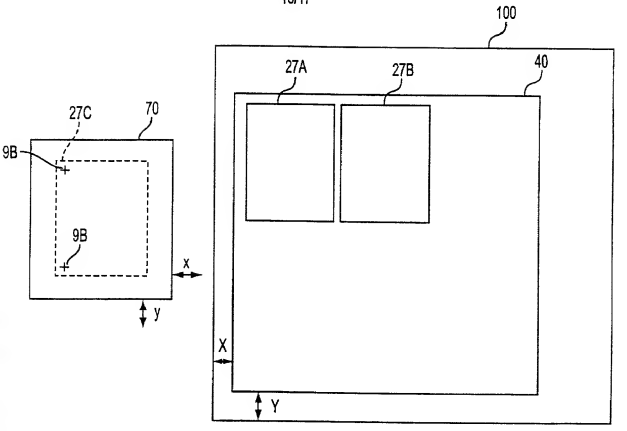

FIG. 14C

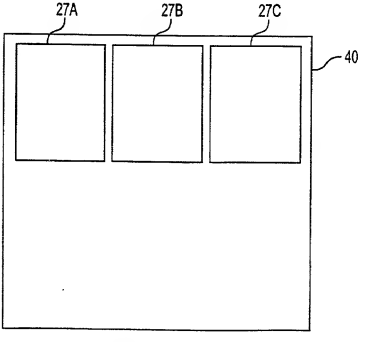

FIG. 14D

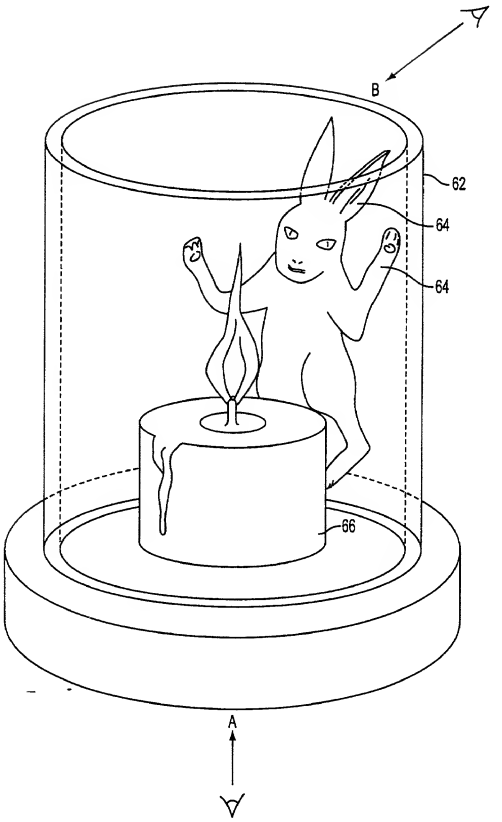

FIG. 15

FOR UTILITY/DESIGN
CIP/PCT NATIONAL/PLANT
ORIGINAL/SUBSTITUTE/SUPPLEMENTAL
DECLARATIONS

RULE 63 (37 C.F.R. 1.63)
DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PW FORM

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the **INVENTION ENTITLED PARTIAL IMAGING OF A SUBSTRATE WITH SUPERIMPOSED LAYERS**

the specification of which (CHECK applicable BOX(ES))

X A. ☐ is attached hereto.

BOX(ES) → B. ☒ was filed on August 2, 2001 as U.S. Application No. 09/

→ C. ☒ was filed as PCT International Application No. PCT/ IB00/00267 on Febuary 3, 2000

and (if applicable to U.S. or PCT application) was amended on

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. Except as noted below, I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International Application which designated at least one other country than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International Application, filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority claimed, before the filing date of this application:

PRIOR FOREIGN APPLICATION(S) Number	Country	Day/MONTH/Year Filed	Date first Laid-open or Published	Date Patented or Granted	Priority NOT Claimed

If more prior foreign applications, X box *at bottom* and continue on attached page.

Except as noted below, I hereby claim domestic priority benefit under 35 U.S.C. 119(e) or 120 and/or 365(c) of the indicated United States applications listed below and PCT international applications listed above or below and, if this is a continuation-in-part (CIP) application, insofar as the subject matter disclosed and claimed in this application is in addition to that disclosed in such prior applications, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of each such prior application and the national or PCT international filing date of this application:

PRIOR U.S. PROVISIONAL, NONPROVISIONAL AND/OR PCT APPLICATION(S) Application No. (series code/serial no.)	Day/MONTH/Year Filed	Status pending, abandoned, patented	Priority NOT Claimed
60/118,480	3 February 1999	Completed	
PCT/IB00/00267	3 February 2000	Patented	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint Pillsbury Winthrop LLP, Intellectual Property Group, telephone number (703) 905-2000 (to whom all communications are to be directed), and persons of that firm who are associated with USPTO Customer No. 909 (see below label) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent, and I hereby authorize them to delete from that Customer No. names of persons no longer with their firm, to add new persons of their Firm to that Customer No., and to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/ organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct the above Firm and/or an attorney of that Firm in writing to the contrary.

USE ONLY FOR PILLSBURY WINTHROP

00909

(1) **INVENTOR'S SIGNATURE:** ✕ Roland Gerege Date: ✕ August 13, 2001

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☐ FOR ADDITIONAL INVENTORS see attached page.

☐ See additional foreign priorities on attached page (incorporated herein by reference).

Atty. Dkt. No. P268453
(M#)

Rule 56(a) & (b) = 37 C.F.R. 1.56(a) & (b)
PATENT AND TRADEMARK CASES - RULES OF PRACTICE
DUTY OF DISCLOSURE

(a) ...Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the [Patent and Trademark] Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability...(b) information is material to patentability when it is not cumulative and (1) It also establishes by itself, or in combination with other information, a prima facie case of unpatentability of a claim or (2) refutes, or is inconsistent with, a position the applicant takes in: (i) Opposing an argument of unpatentability relied on by the Office, or (ii) Asserting an argument of patentability

PATENT LAWS 35 U.S.C.

§102. Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless--

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months* before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

§103. Condition for patentability; non-obvious subject matter

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made. . . .

(c) Subject matter developed by another person, which qualified as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

* Six months for Design Applications (35 U.S.C. 172).